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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/597,136 | 07/12/2006 | Kenji Kitamura | SHM-16693 | 6533 |

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| EXAMINER | |
|---|---|
| LI, MEIYA | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2811 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 02/04/2009 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/597,136 | KITAMURA ET AL. | |
| | Examiner | Art Unit | |
| | MEIYA LI | 2811 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *28 August 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-3* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 28, 2008 has been entered.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-3 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. The claimed limitation of "a first conductive type", as recited in claim 1, is unclear as to which first conductive type applicant refers.

5. The claimed limitation of "a second conductive type", as recited in claim 1, is unclear as to which second conductive type applicant refers.

6. The claimed limitation of "an upper part of the high resistance layer", as recited in claim 1, is unclear as to which upper part of the high resistance layer applicant refers.

***Claim Rejections - 35 USC § 103***

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 1-2, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Okura et al. (2003/0052400) in view of applicant's admitted prior art (""AAPA").

As for claim 1, Okura et al. show in Fig. 8 and related text a semiconductor device module structure comprising:

a high-resistance layer 103 of a first conductive type N;

a base layer 104 of a second conductive type P formed in an upper part of the high-resistance layer of the first conductive type;

an emitter region 105 of a first conductive type N formed in an upper part of the base layer of the second conductive type;

an emitter electrode 14 connected to the emitter region;

an insulated gate electrode 107 adjacent to the base layer of the second conductive type;

a part formed around a cell region including the emitter region;

a collector layer 102 of the second conductive type formed on the underside of the layer of the first conductive type;

a collector electrode 113 connected to the collector layer; and

a metal flat plate upper heat-sinking part 4 connected to the emitter electrode,

wherein the guard ring part comprises:

a semiconductor layer 104 of a second conductive type P disposed on an upper part of the high resistance layer of the first conductive type and located around the emitter region;

an insulating layer 109 formed on an upper part of the semiconductor layer of the second conductive type; and

a passivation layer 3 covering the insulating layer without covering the cell region, the passivation layer being disposed in a non-contact relation to the upper heat-sinking part.

Okura et al. do not explicitly state that the part is a guard ring part around the cell region; a buffer layer of a first conductive type formed on an underside of the high-resistance layer of the first conductive type.

AAPA teaches a guard ring part around the cell region; a buffer layer of a first conductive type N formed on an underside of the high-resistance layer of the first conductive type N (Figs. 5-6).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to include a guard ring part around the cell region and a buffer layer, as taught by AAPA, in Okura et al.'s device, in order to provide a better protection of the device; and in order to improve the performance reliability of the device.

As for claim 2, the prior art combined device shows the semiconductor device module structure comprises a diode part, and wherein a cathode electrode located in an

upper part of the diode part between the high-resistance layer and the upper heat sinking part is connected to the upper heat-sinking part.

9. Claim 3, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Okura et al. (2003/0052400) and applicant's admitted prior art (""AAPA"), as applied to claim 1 above, further in view of Hirano et al. (2003/0122232).

Okura et al. and AAPA disclosed substantially the entire claimed invention, as applied to claim 1 above including one end of the metal fat plate upper heat-sinking part 4 is connected to the emitter electrode 14.

Okura et al. and AAPA do not explicitly state that the opposite end of the metal flat plate heat-sinking part is connected to a substrate.

Hirano et al. teach the opposite end 50a of the metal flat plate heat-sinking part 50 is connected to a substrate 46 (Fig. 14).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to include the structure of heat-sinking part, as taught by Hirano et al., in Okura et al. and AAPA's device, in order to provide a better heat dissipation of the device.

### *Response to Arguments*

10. Applicant's arguments filed on August 28, 2008 have been fully considered but they are not persuasive.

Applicant argues that "Okura does not teach a non-contact relation between the passivation layer and the heat sink."

A non-contact means two elements are not in directly contact. Therefore, Okura teach a non-contact relation between the passivation layer and the heat sink because they are in indirectly contact with each other.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MEIYA LI whose telephone number is (571)270-1572. The examiner can normally be reached on Monday-Friday 7:30AM-5:00PM Eastern Standard Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on (571) 272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. L./
Examiner, Art Unit 2811
1/30/2009

/Ori Nadav/
Primary Examiner, Art Unit 2811